Acoustic profiles in emotion – the GEMEP corpus
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The Geneva Multimodal Emotional Portrayals

For carefully controlled recordings and less easily induced emotions acted expression is presently the best option. Four important criteria for corpora of acted emotional speech have been put forward [1]:

1) **Scope**: number speakers, languages, emotional states
2) **Naturalness**: materials should be as natural as possible
3) The **multimodal** nature of emotion
4) **Annotation** and description possibilities vis-à-vis naturalness

The GEMEP corpus [2] takes these points into account. Ten actors of different ages and gender expressed emotions in interaction with a professional director, according to Stanislawski principles. The corpus consists of 18 emotions, some rarely studied. The audiovisual recordings were, selected and annotated in the vocal, facial and gestural domain.

**Corpus design and recording**

<table>
<thead>
<tr>
<th>Valence</th>
<th>positive</th>
<th>negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>emotion</td>
<td>elation</td>
<td>hot anger (rage)</td>
</tr>
<tr>
<td></td>
<td>amusement</td>
<td>panic fear</td>
</tr>
<tr>
<td>(sensual)</td>
<td>pleasure</td>
<td>cold anger (irritation)</td>
</tr>
<tr>
<td></td>
<td>relief</td>
<td>anxiety (worry)</td>
</tr>
<tr>
<td></td>
<td>interest</td>
<td>sadness (depression)</td>
</tr>
</tbody>
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+ shame, surprise, disgust
admiration, contempt, tenderness

U1: “Ne kali bam soud molen” (declarative)
U2: “Koun se mina loud belam” (interrogative)
U3: “Aay”

Four modulations: normal, more intense, less intense, masked

1260 emotion portrayals were judged for the selection of the best portrayals, based on recognition and believability indices. Based on our criteria, portrayals of shame needed to be removed. Of the remaining emotions, one portrayal by each actor was included, resulting in 150 portrayals.

**Future directions**

- Further bodily and facial annotation
- Development of analysis for multimodal expression and synchrony
- Development of a Multimodal Emotion Recognition Test
- Development of stimulus material for neuroscience / psychology

**References**


**Acoustic profiles in Emotion**

Acoustic parameters (see table) were extracted for the whole utterance using standard PRAAT settings. F0 contours were manually checked and corrected.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Voice quality</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration mean</td>
<td>F0 mean and sd</td>
<td>Intensity mean and sd</td>
</tr>
<tr>
<td>Duration voiced parts</td>
<td>F0 max (95%) and min (5%)</td>
<td>Intensity max (95%) and min (5%)</td>
</tr>
<tr>
<td>Duration unvoiced parts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration silences</td>
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</table>

**Results**

The results show clear differences between emotions in the basic acoustic measures as well as in the voice quality measures. A MANOVA showed clear effects of each variable ($F_{min} = 1.7, p < 0.05$) with the exception of jitter and the duration of silences.

A principal component analysis yielded four interpretable components (76% of the variation). The first (40%) is related to arousal ($F_0$ and intensity) and the second to duration (14%). The third (12%) and fourth (10%) component represent voice quality, with component three loading negative on the amount of spectral regularity and the fourth loading positive (in different measures).

**Conclusions**

1) Acoustic variables are significantly related to (portrayed) vocal emotional expression
2) Duration, $F_0$, and intensity account for more than 50% of the explained variance, voice quality measures for about 25%

**Future directions**

- The role of voice quality
- Fine grained measurements at the phoneme level
- The development of new acoustic parameters
- Prosodics analysis
- Investigating the role of intra- and interindividual differences

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The Geneva Emotion Wheel used in the ratings

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